

Robust Aeroservoelastic Control Utilizing Physics-Based Aerodynamic Sensing, Phase II

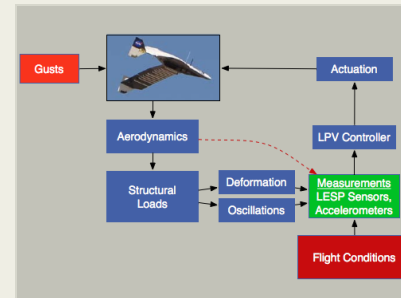
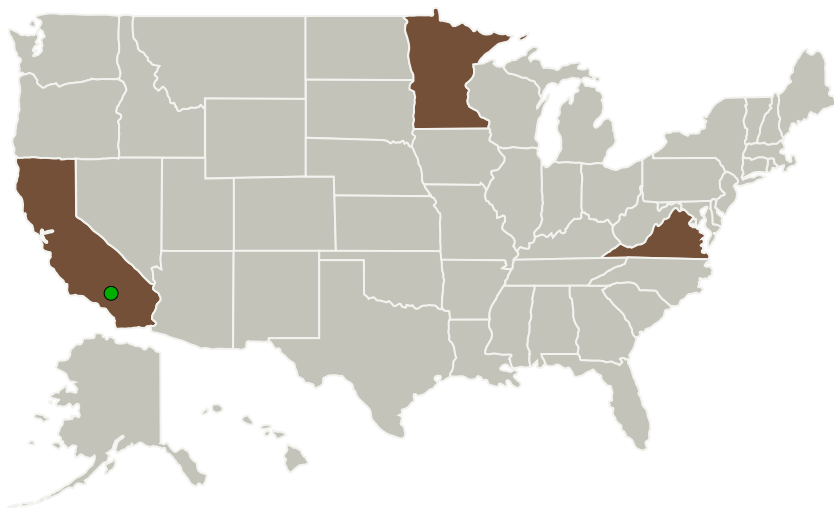
Completed Technology Project (2012 - 2015)



Project Introduction

New aircraft designs depend on an integrated active approach to flight control, flutter suppression and structural mode attenuation to meet desired handling quality performance and gust load alleviation. Tao Systems will team with Professor Gary Balas at the University of Minnesota to (1) develop a robust controller that demonstrates improved aerostructural performance over current state-of-the-art techniques by utilizing a novel aerodynamic load sensor, and (2) provide a robust linear parameter varying controller that (a) requires no ad hoc methods of gain-scheduling, (b) provides robustness guarantees that more traditional methods do not offer, and (c) allows for explicit rate bounds enabling less conservative, higher performing controller designs. The benefits include improvement of aerodynamic and structural efficiency using robust aeroservoelastic control methods over a range of flight speeds, in the presence of significant turbulence.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Images	3
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Tao of Systems Integration, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Hampton, Virginia
● Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California
University of Minnesota-Twin Cities	Supporting Organization	Academia	Minneapolis, Minnesota

Primary U.S. Work Locations

California	Minnesota
Virginia	

Project Transitions

▶ **June 2012:** Project Start

✓ **March 2015:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137304>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tao of Systems Integration, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Arun Mangalam

Co-Investigator:

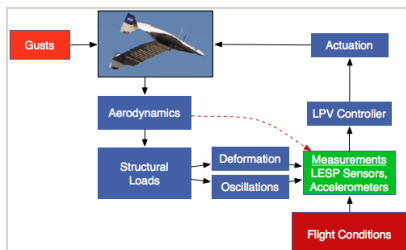
Arun Mangalam

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Images

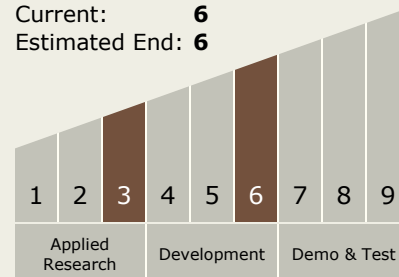


Project Image

Robust Aeroservoelastic Control
Utilizing Physics-Based
Aerodynamic Sensing
(<https://techport.nasa.gov/image/131025>)

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - TX15.1 Aerosciences
 - TX15.1.3 Aeroelasticity

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System